Strategic Risk Analysis of Alternative Delta Futures

Ellen Cheng

Public Comments

No public comments were received for this proposal.

Initial Selection Panel Review

Proposal Title

#0319: Strategic Risk Analysis of Alternative Delta Futures

Funding:

Do not fund

Initial Selection Panel (Primary) Review

Topic Areas

- Environmental Influences On Key Species And Ecosystems
- Direct And Indirect Effects Of Diversions On At−risk Species
- Processes Controlling Delta Water Quality
- Implications Of Future Change On Regional Hydrology, Water Operations, And Environmental Processes
- Water Management Models For Prediction, Optimization, And Strategic Assessments

Please describe the relevance and strategic importance of this proposal in the context of this PSP. How does the proposal address the topic areas identified above? What are the broader CALFED Goals this proposal may meet that are not accounted for in these specific topic areas?

This project takes the big picture, using a general modeling framework which is supported by "low resolution" models of physics and biology. The general model is to provide long−term Delta−wide scenarios and strategies. This allows creation of sets of consequences and benefits to be generated for various actions. There is a large potential benefit to planners and "stakeholders" from such a tool. The work is clearly related to the items cited above as well as directly supportive of the "improving tools" priority topic area.

The budgets of proposals submitted in response to this PSP are larger, on average, than those submitted to CALFED in previous years. The Science Program is committed to getting as much science per dollar as is reasonably possible. With this commitment in mind, can the

proposed budget be streamlined? If so, please recommend and clearly justify a new budget total in the space provided.

The technical reviewers believe that the budget is reasonable. One reason for the modest budget may be that the investigators have been working in this intellectual area for some time.

Evaluation Summary And Rating.

Provide a brief explanation of your summary rating and any additional comments you feel are pertinent.

The concept of a broad view tool based on "low resolution" models is not new and seems to ignore the progress that has been made with "high resolution" models which the proposal dismisses as "... prohibitively expensive and time consuming, nearly impossible to integrate, and would probably yield confusing results beyond the models range of calibration." This statement is at least an exaggeration and more likely incorrect. The "cellular automata" model is a set of rule−based and linked box models and so not really new. A reviewer notes that the actual meaning of "low resolution" is not defined; one cannot tell if they mean spatially aggregated or simplisitc mechanism models or both. No evidence is presented to indicate that new "low resolution" models are needed or indeed that new general models are needed; the only statement being that no one has thought through the scenarios for an evolving Delta system. As pointed out by reviewers, there is no clear validation plan [note however that the proposal outlines means of validating or calibrating the "low resolution" models, but not the assemblage]. This assessment differs from the technical and collaborative assessments, which while containing some criticisms, are generally supportive of this project.

Selection Panel (Discussion) Review

fund this amount: $**0**
note:
do not fund

This proposal is one of a suite of proposals that intend to produce a big–picture, forward–thinking strategic tools for understanding conditions in the Delta under multiple future climate and management scenarios.

The project team appears well–qualified to do this kind of work; however, the appropriateness of their approach was questioned. This tool will not be based on previous, low–resolution models; the proponents actually intend to re–develop the existing low–resolution models. The Panel agreed that using the best existing sub–models make more sense, additionally, the Panel was concerned that the tool and the redesigned sub–model might not be adequately validated. It was noted that other proposals used existing sub–models.

Panel Ranking: Do Not Fund

Collaboration Panel Review

Proposal Title

#0319: Strategic Risk Analysis of Alternative Delta Futures

Final Panel Rating
above average

Collaboration Panel (Primary) Review

Collaboration:

Will the results of the collaborative effort be greater than the sum of its parts? Is it clear why the subprojects are part of a larger collaborative proposal rather than several independent smaller ones?

above average
the collaboration of engineers, scientists, planners, and economists to prepare a strategic risk analysis of different delta futures will definitely be greater than the sum of its parts, and represents a unique opportunity for CALFED and the shareholders to wisely plan for the future

Interdependence And Integration:

Does the proposal have an example that clearly articulates the conceptual model of each subproject and how they link together as a whole? Are the boundaries of the study plans focused and cohesive, yet well delineated? Is there a plan for potential differences in the stages of subproject completion times? Are there clear plans for analyses and interpretations which seek to identify and quantify relationships among the data collected in various subprojects rather than separate analyses for each subproject?

above average
clear final integration with at least semiquantitative results; clearly written, focused and logical

Project Management:

Is it clear who will be performing management tasks and administration of the project? Are there resources set aside for project management and time given for investigators to collaborate? Is there a process for making decisions during the course of the project? Are there acknowledgments of potential barriers to collaboration and explanations of how team members will overcome barriers particular to their institutions?

above average
clear breakdown of tasks and responsibilities; NHI has much experience in managing similar studies

Team Composition:

Does the lead principal investigator have successful management history and experience leading collaborative teams? Is it clear that all key personnel are committed to making significant contributions to the project? Do team members have complementary skills?

above average
key personnel seem well qualified and committed, and complement each other; the lead investigator has ample experience leading successful collaborative teams in planning exercises

Communication Of Results:

Is there a clear plan for comprehensive and cohesive reporting of project progress to the CALFED community?

above average
facilitated workshops, peer-reviewed journal articles, brouchures, and website outlets

Additional Comments:

Collaboration Panel (Discussion) Review

Primary reviewer judges proposal as a strong collaboration of a wide diversity of investigators that should generate study findings that will greatly help decisionmakers plan wisely for the future. The integration and project management is strong, with a clear breakdown of tasks and responsibilities outlined; team composition is strong and has a good track record;communication of results is adequate. A much needed study, and will be challenging to execute because of the wide diversity of specialties involved. The secondary reviewer is in full agreement to evaluation, and both assign an Above Average rating.

Technical Synthesis Panel Review

Proposal Title

#0319: Strategic Risk Analysis of Alternative Delta Futures

Final Panel Rating
above average

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

This proposal to develop knowledge, models and technology to prepare strategic risk analysis of Delta futures is well written, uses conceptual models appropriately and addresses the right issues, i.e., climate change, water demands, population, etc. The objectives are clear, and approaches to address the objectives, such as low resolution modeling are well developed and recognize that this will only be a first step. The proposal is ambitious but detailed in scope of work. The proposal will use appropriate experts as well as involve stakeholders. Although it seems "all encompassing", it does address major issues of the day in an organized and well documented fashion.

Additional Comments:

This proposal to develop knowledge, models and technology to prepare strategic risk analysis of Delta futures is well written, uses conceptual models appropriately and addresses the right issues, i.e., climate change, water demands, population, etc. The objectives are clear, and approaches to address the objectives, such as low resolution modeling are well developed and recognize that this will only be a first step. The proposal is ambitious but detailed in scope of work.

The proposal will use appropriate experts as well as involve stakeholders. Although it seems “all encompassing”, it does address major issues of the day in an organized and well documented fashion.

Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

The applicants propose to use low−resolution models to develop a risk−analysis model for future water scenarios in the Delta. The external reviewers and the panel recognized the pressing need for this type of project and felt that this proposal would result in very valuable products. The project team is highly qualified to conduct this work. This is an extremely ambitious project but the proposal is detailed and well−written. The authors indicate that they will test and validate various components of their model. The panel appreciated that the applicants recognized the need for studying and incorporating model uncertainty, however, the applicants do not describe their approach to the validation process – an unfortunate (though not uncommon) weakness. Also, some of the physical “rules” for the “rule−based” modeling require further clarification. The panel appreciated the applicants strong public outreach component that will involve stakeholders to an apparent greater extent than other, similar proposals it considered.

Rating: Above Average

Technical Review #1

proposal title: Strategic Risk Analysis of Alternative Delta Futures

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**Yes, there are three clearly stated goals and objectives: 1) Develop a low-resoultion tool to serve as framework for evaluating different Delta mgmt scenarios given climate change and pop growth projections; 2)Identify economic, ecological, and water supply outcomes for the range of scenarios; and 3) Communicate what is learned from these exercise with the broader Delta community including agencies, stakeholders, scientists.** **There are no clearly identified hyptheses and as a result the reader must infer and extrapolate. It appears that the broad hypothesis is that to date CALFED has used near-term planning tools that represent a "static" system to address problems associated with levee stability, wsr, wq, and eco rest, despite the fact that the system is not "static" and that factors outside the control of CALFED will likely dictate the outcome of, or at least significantly effect, CALFED's efforts. To this end the proposal aims to develop long-term models that capture - among the more oft-modeled factors - these "outside forces", including climate change, associated sea level rise, earthquakes, population growth, and urbanization, and develop management strategies and scenarios.**

	The project proponent is responding to an increasingly vocal group of scientists suggesting that there is remaining a very brief window of time to plan for the inevitable changes these "outside forces" will bring to bear on the Delta system. The proposal ideal is certainly timely and important, in that it recognizes the need to develop tools that capture the issues identified above but that also recognize the instability of the system (e.g., levee stability concerns), and that functions within a longer−term planning horizon. CALFED may be constrained by political forces and therefore unable to accomplish this; as such, perhaps a third party can provide alternative approaches to developing management 'solutions'.
Rating	**very good**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**Yes, it is justified given the critical importance of the Delta to the majority of Californians, from a drinkin water supply perspective, as well as to the ag community for irrigation water, and from an ecological sustainability perspective. The proposal points out that there has been and will continue to be astounding population growth in CA, and that climate change and the liklihood of earthquakes pose enormous risk to CA's water supply. It also points to existing (unpublished) modeling that suggest massive Delta water quality impacts (due to changes in salinity) and massive levee failure as a result of a catastophic event such as an earthquake. Given the long−standing and ever more complex and contentious conflicts that exist among 'user groups' over current and future**

	Delta management, this proposed work would provide potentially new perspective and provide a new/alternative framework for discussing future management scenarios. that said, it is not likely that this work (nor any other) would move the parties from their long held political/institutional postions. **The proposal does not describe an overall conceptual model. It does indicate (Task 2.2) the development of a "conceptual understanding of major Delta processes to be represented by existing models and new low resoluation models...". EAch phase of work, however, does include a conceptual model/representative model schematic for the development of the models, as well as how the model will be integrated.** **This is a research project and is justified as such. The proposal aims to develo an integrated low-resolution model that will produce outputs relative to a range of scenarios that will then inform discussion in the broad Delta community. The proponet ultimately would envision this process having an influential effect on the development of mangement and policy as they relate to the future of the Delta.**
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The proposal is critical of the current approach to Delta management, which is to say, it is critical of the current (and proposed future) approach to the Delta vis a vis the investment of billions of dollars based on the "notion that the Delta and its hydrology will remain relatively fixed over time and that the**

Delta should remaim fixed over time." It goes on to proport that is not the case and that given certain eventual changes, there must be an alternative framework for developing management strategies – in other words, CALFED must accept that future changes are inevitable and plan future investments to accomodate those changes. To this end the approach, as described, seems well designed and appropriate given the project's objectives, and is very likely feasible. The heart of the project is the development of a low–resoulation model that analyzes water supply, wq, and ecological outcomes for a range of possible future scenarios and management responses. The framework for this model was developed by one of the project proponents. First, there would be the development of a GIS based model to predict the economic and physical consequences of various levee failure scenarios under different mangement regimes. SEcond, would be the development of a hydrodynamic and wq model to evaluate water supply and ecological effects of varying inflow/export regimes under different infrastructure scenarios. Third, there would be the use of existing model run to general different supply, demand, and economic outputs under a range of climate and population futures. Outputs would be entered into a database to form the basis for analyzing a range of scenarios and producing a decision analysis method to analyze these scenarios. This would involve input from experts and stakeholders outside the project team.

The results of this ambitious model development and analysis process is likely to yield new information which would add to the knowledge base. The intention is to engage the broader Delta community in a series of

	workshops to assist in development of the tool – this is likely to grab the attention of decision makiers. However, the proposal does not describe a strategy for directly engaging decison makers in future application of the tool.
Rating	**very good**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**Each task is fully described and well documented (and steeped in an understanding of what data, human, other challenges exist in terms of working on devising Delta management strategies) in terms of model development, testing, and output compilation, basis for approach to estimating and predicting the various parameters and associated costs of each action, use of existing data and inputs, characterization of performance indicators, establishing and populating a user database, assemble and facilitate workshops, review teams, generate scenarios, and develop final report and web-based presentation. The proposal recognizes areas where there is high level of disagreement and a range of interpretations regarding the applicability of a indicators. It also recognizes that certain cases, there will only be attainment of 'rough approximations' of results, yet the proponents are confident that this is adequate for decision tree development and analysis.** **The scale of the project is consistent with the objectives as described, and from the reviewer's knowledge of the lead proponent's skills and abilities, is within the grasp of the authors – a multi-disciplinary team, which includes consultants outside of CA, a key attribute.**
Rating	

	excellent

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	Not applicable.
Rating	not applicable

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	Yes, there are five proposed products that range from long−term perspective on Delta managemetn strategies, an integrated set of low−resolution models for long−term Delta management and consequences considering a variety of scenarios, assessemtn of knowledge gaps and limitations in understanding consequences of different strategies, set of risk−based performance analyses of strategies, a stakeholder/manager/scientist process for reviewing strategies, adn a final report and web−based presentation. From the proposal it appears that each would add value. There is no mention of contribution to larger data management systems and this is probably not feasible anyway. The data would be housed in a framework model (QUEST)and will be available for manipulation vis a vis web−based applications. The project is driving toward alternative long−term management strategies for the Delta that can be interpreted by a wide array of Delta constiuents.
Rating	excellent

Additional Comments

Comments	**NOne**

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	**This is a multi-disciplinary team that includes modelign expertise, as well as engineers, ecologists, planners, economists, hydrologists, and expertise in stakeholder engagement processes. NHI - the lead - has a solid reputation in the policy as well as technical realms, and is known for its commitment to developing solutions (or least alternatives) to complex problems as they relate to CA water management and policy. The project proponent, John Cain, has significant experience in managing complex, mult-party projects in the Delta and surrounding systems, and is technically qualified to develop this tool. UC DAvis scientists are also well-qualified for this study. I am not familiar with ESSA Technologies but from the bios staff appear to have the appropriate familiarity with the Delta and relevant technical expertise. They also bring the added benefit of existing outside of CA and therefore may not be seen as biased.**
Rating	**excellent**

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**Given the breadth, depth, and technical complexity of what is proposed, the budget seems very reasonable (grand total of $785,292).**
Rating	**very good**

Overall

Provide a brief explanation of your summary rating.

Comments	**It appears that this tool would be very useful in helping to frame Delta water policy discussions as well as management decisions in the coming years given the changing landscape (continued population growth and farmland conversion) and the high liklihood that levee instability (if not localized failure) will become an even larger management concern and financial liability. Leaving climate change aside for the moment, these looming threats alone are substantial enough to justify the development of long-term models that provide a mechanism for at least framing discussion around 'options' for the future. If the model and tool development described in this proposal are successful, and if Delta interests will engage in a broader discussion of management options that accepts the threat and risk of climate change, levee failure and population growth/demand, then that will signal progress in and of itself.**
Rating	**excellent**

Technical Review #2

proposal title: Strategic Risk Analysis of Alternative Delta Futures

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**The goals are reasonable and well−conceived. The issue is fundamentally important. The methods are appropriate, mostly.**
Rating	**very good**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**The proposal addresses an extremely important question by integrating many types of relevant experts. The project justification on pages 24−28 is particularly strong.**
Rating	**very good**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**Some passages of the proposal give me confidence in the approach because they make**

me think that the modelers will build on valuable experience. For example, page 9 of the proposal says "to analyze a full range of scenarios would be prohibitively expensive and time consuming, nearly impossible to integrate, and would probably yield only confusing results beyond the models' range of calibration. However, output from strategically selected model runs, much of which already exists, could be effectively utilized as input to a low-resolution modeling framework". This statement is completely consistent with my experience as a professional modeler. I endorse the idea of clearly presented results, which means a few coarse model runs to show the range of possibilities with some broad analysis of uncertainty. Most of the high-resolution modeling that I have seen gives only the illusion of precision, where as the low-resolution modeling tends to give results that are understandable and meaningful.

This being said, I see only limited proposed effort to assess the certainty of the model results. We need to know whether there are really meaningful differences among the model runs for the various scenarios. If we lack knowledge of the certainty of the model, then we can not address this issue. The scientist should address certainty in the context of their low-resolution model. The modelers will never be able to assess the certainty of the model unless they have a validation phase of the modeling. I fail to see that model validation is part of their plan.

There is a nice plan for stakeholder involvement.

The proposal repeatedly says that the proposed

	methods have been used successfully, but there is no definition of success. Is success defined as that the software did not crash, or that the participants said that it was useful, or that some disaster was avoided, or that the customer paid the bill, or that the scientists won the grant? It is easy to claim success when success is left undefined. **They constantly refer to low resolution, but they never define it. This makes me a bit nervous. What will be the size of the GIS pixels?**
Rating	**good**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**The proposal is feasible since it proposes to build on past work.** **The validation phase seems a bit weak. There is no description of the nature or quality of the data that will be used for verification. Also, there are not proposed measures of validation. It seems the researchers take a Boolean approach to verification that a parameter value is either correct or not. They do not have a plan to assess the level of certainty in the business as usual scenario, so we will not have any idea how the model will perform when it is used to extrapolate future scenarios that are fundamentally different than the past.** **I like the bookend scenarios approach. This is what these types of models are reasonably capable of.**
Rating	**very good**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**The proposal lacks detail on how the project will generate the necessary metadata so that other scientists will be able to benefit from the project's data archive. Others will be able to interact with the data via the web, but I do not see a clear plan to give others full access to the compiled data.**
Rating	**good**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**The proposal has an attractive plan for posting the results on the Internet. This will facilitate stakeholder involvement.**
Rating	**very good**

Additional Comments

Comments	**Overall, the modeling approach is fairly standard in that it makes a best guess, but fails to focus on the certainty of the guess in a sophisticated way. For example, on page 18 the authors state "we are confident that we can predict threshold level response that will result from dramatic changes in the configuration and hydrodynamics of the Delta".** **Anyone can make a prediction. We want to know the estimated accuracy of the prediction. It is not clear that the modelers have a sophisticated approach to assess objectively the accuracy of the prediction,**

	even when there are a lack of dramatic changes, so how can they be certain that they can make useful predictions when there are dramatic changes? Task 4.3 addresses this somewhat.

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The authors are very experienced and well-qualified.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget is very detailed and organized. The amounts are very reasonable.
Rating	excellent

Overall

Provide a brief explanation of your summary rating.

Comments	The proposal is solid, detailed and well organized. It is not ground breaking in the sense that it is standard modeling without sophisticated attention to validation and uncertainty. If the scientists deliver as promised, then the funds will be well spent.
Rating	very good

Technical Review #3

proposal title: Strategic Risk Analysis of Alternative Delta Futures

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**This proposal clearly describes a series of goals and objectives relevant to the long−term management of the Bay−Delta system. These goals and objectives include how to identify and integrate into long−term management strategies issues surrounding planning uncertainties. The proposal makes the important point that the ecosystem is not static and both it and outside factors will continue to change. One aspect in particular I commend, is the active engagement of the stakeholder community, both during the project and at the project's completion.**
Rating	**excellent**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**The authors have done an excellent job of laying out a conceptual model with enough detail that it can be easily understood. A range of issues potentially impinging on Bay−Delta management are described in sufficient detail that it is clear that the team has a solid understanding of the basis of its proposed work. Moreover, the expertise of**

	the team assembled mirrors the range of issues identified in the proposal, making the proposal internally consistent. The scope of work is solid and comprehensive. The authors propose to develop new tools because, as they point out, the use of existing high-resolution models would result in a range of scenarios whose analysis "would be prohibitively expensive and time consuming, nearly impossible to integrate, and would probably yield only confusing results beyond the models' range of calibration."
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The approach is well thought out and the project should contribute new knowledge to management of the Bay-Delta system. The authors propose to develop new models to describe the behavior of the system, such as low-resolution hydrodynamic and water quality models. Integration of model results into the QUEST framework should result in a manipulable and comprehensible tool that will be useful to decision makers. The involvement of stakeholders at all stages of the project should also enhance its credibility and ultimate utility. The goal of producing an interactive, web-based presentation is an attractive outcome to maximize the reach of the project. The integration of economic theory into the project is another key aspect.**
Rating	**excellent**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**The authors have fully documented the tasks and steps that will be carried out during the three−year duration of the project, down to oversight of the project. The project seems feasible in that the types of models to be developed and the other tasks being proposed appear to be well within the grasp of the authors given their prior research experiences. The tasks described are consistent with the project's objectives and the authors recognize the importance of drawing upon outside expertise to ensure the soundness of their work.**
Rating	**excellent**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**N/A**
Rating	**not applicable**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**The products fall into five categories − quantitative analysis of future scenarios, integrated modeling outputs, assessment of knowledge gaps, preliminary analyses of management strategies, and process for**

	examining strategies – that comprehensively reflect the scope of the project and should have future utility. Because the project's methods are relatively transparent, the products should be easily interpretable, appeal to a diverse audience, and influence future decision making. The form of the products (e.g., journal articles, reports, web presentation) should result in wide dissemination of results.
Rating	excellent

Additional Comments

Comments	The authors seem to have a healthy appreciation of the difficulty of some of the tasks they have identified and realistic views of what they can accomplish. For example, on page 18 they wrote "We realize that identifying physical indicators of species abundance and ecosystem response in the Delta is the holy grail of more than a decade of scientific endeavor, but we are confident that we can predict threshold level response that will result from dramatic changes in the configuration and hydrodynamics of the Delta."

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The team covers a range of disciplines complementary to one another and the scope of the project. The team has prior experience working on this ecosystem and with the proposed tools. Management of the project is clearly delineated, an important issue given the coordination that will be required for the project to be successful. The authors also propose to involve outside experts for review on an as-needed basis.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**The budget seems justified for the magnitude, breadth, and duration of the proposed project. I applaud the team for including graduate student support.**
Rating	**excellent**

Overall

Provide a brief explanation of your summary rating.

Comments	**The proposed project is ambitious but the detailed scope of work presented by the authors gives me great confidence that they will be able to execute the project and produce an interesting and informative set of results. The assembled team is interdisciplinary, reflecting the range of issues needing to be addressed in this type of project. Other strengths of the project include the development of new models and the integration of new knowledge within a novel framework that is accessible by a non-technical user community. By recognizing the relevant and important values stakeholders bring to these sorts of management issues and the need to incorporate these values upfront, the authors boost the probability that the outputs will have utility to decision makers. This project should serve as a model to other similar endeavors.**
Rating	**excellent**